The Optical Image Enhancement Feasibility Study Collection, 1982-1983
0.6 cubic feet
JPL 161

History

The Optical Image Enhancement Feasibility Study was conducted by the Jet Propulsion Laboratory (JPL) for the U.S. Air Force, Western States Missile Command (WSMC), Vandenberg Air Force Base (VAFB). The purpose of the study was to assess optical data limitations, provide additional optical capabilities for future programs, and determine the feasibility of image enhancement techniques for future applications. JPL converted videotape from VAFB containing an assortment of different visual image tracking types to a digital format, then to a photographic negative. JPL selected various approaches that provided maximum improvement in interpretation and feature discrimination of the image subject.

The images produced by JPL were pairs of photos consisting of a raw image data and processed image data that was linearly stretched to enhance areas of interest. JPL identified six subdivisions of images: STS-4, Quasar, Deployment vehicles, Nozzle, Stage and Fan.

STS-4 was the fourth flight of the Space Shuttle, the last two-person crew test flight of the Shuttle before it was deemed operational. Columbia was launched on June 27, 1982 from Cape Canaveral, and landed at Dryden Flight Research Facility on July 4, 1982.

The original period of performance was between September 30, 1982 through March 31, 1983. JPL Task Manager was Robert J. Blackwell. Program Manager was Henry W. Norris. The official in charge of the study at Vandenberg was Captain Lance Okimoto.

Provenance

The collection originated from the office of Kevin J. Hussey, Section 384, Image Processing Laboratory. It was transferred from Hussey to the Federal Records Center in Laguna Niguel, CA, on September 14, 1984. The shipment was then transferred to the JPL Laboratory Records Center in December 1987 and from the LRC to the JPL Archives in 1989.

Collection Arrangement and Description

The collection includes photographs, negatives, correspondence, presentation materials, handwritten notes and three open reel magnetic data tapes documenting the Optical Image Enhancement Feasibility Study.

The photo sets are accompanied by short reports from JPL explaining the results. The first batch of photographs was returned to VAFB in November 1982. The black-and-white images created by JPL for VAFB used a gray scale of 256 shades of gray. A histogram was provided in each photograph to show the distribution of the pixel shade values for all picture elements in the image. The Quasar and Fan sequences represented time sequences. Quasar was taken at 1/30th of a second over a 4/30th of a second period. Fan series was recorded at 1/5th of a second and represent approximately 2.4 seconds.

A second batch of digitally processed images was sent to WSMC at Vandenberg in February 1983. Four of the series were enlarged and zoomed in on the subject. The Fan sequence had no sizing performed on it, but had added pseudocolor to show the additional information created by using color. The pseudocolor was created by passing the original gray scale data through red, green and blue filters to produce the colored image.

Two presentations made by Bill Ault and Captain Lance Okimoto of WSMC to JPL, dated April 1, 1983 and June 14, 1983, are represented in the collection.

Conservation/Preservation

Standard preparations of documents for long term storage were completed.

Separation Statement

The original accession (1989-11) was split into eight separate collections: Optical Image Enhancement Feasibility Study Collection (this collection), Office of the Director Collection (JPL 142), JPL Executive Council Collection (JPL 150), U.S. Army Projects Collection (JPL 154), Radio Science Collection (JPL 155), Deep Space Network Hardware Collection (JPL 156), Spacecraft Configuration Testing Collection (JPL 159), and the Mariner Mars Contractor Reports Collection (JPL 160).

Finding Aids

No other finding aids exist for the collection.

FILE FOLDER LIST

Box 1 of 2

Fld. 1	Contents of Magnetic Data Tapes BAH001, BAH002, BAH003, 1982.
Fld. 2	Optical Image Enhancement Feasibility Study Documentation, 1982-1983.
Fld. 3	Negatives of First Trial, October 1982.
Fld. 4	Preliminary Images Done Prior to First Meeting with Vandenberg, October 26, 1982.
Fld. 5	Photographs, Raw Data and Linear Stretch, STS-4, Quasar, Deployment vehicles, Side Nozzle, Stage Separation, Fan sequence, November 15, 1982.
Fld. 6	Photographs, Brightness Values, November 1982.
Fld. 7	Photographs, Brightness Values, Quasar 1R-4R, Deployv 1R-2R, Nozzle 1R-3R, Stage 1R-2R, 1983.
Fld. 8	Photographs, Brightness Values, Fan, Quasar, January 5, 1983.
Fld. 9	Final Image Processing Tasks, May 1983.
Fld. 10	Photographs, Inner Plume, 13 images; Outer Plume, 7 images, April 29, 1983, delivered to VAFB May 29, 1983.
Fld. 11	Optical Image Enhancement Feasibility Study Presentations, April-June 1983.
Fld. 12	VICAR Program and Video-Digital-Photographic Conversion of Images, August 1983.

Box 2 of 2

Fld. 13	Three reels of 1/2 inch magnetic data tape, recorded at 6250 BPI; 10 1/4" reels with NARTB hubs. Labeled "BAH001," "BAH002," and "BAH003." No dates.

CATALOG DESCRIPTION

Optical Image Enhancement Feasibility Study Collection, 1982-1983.

0.6 cu. ft. (2 boxes; 13 folders)

The Optical Image Enhancement Feasibility Study was conducted by Jet Propulsion Laboratory (JPL) for the U.S. Air Force, Western States Missile Command, (WSMC), Vandenberg Air Force Base (VAFB). The purpose of the study was to assess optical data limitations, provide additional enhancement techniques for future programs, and determine the feasibility of image enhancement techniques for future applications. JPL converted videotape from VAFB containing an assortment of different visual image tracking types to a digital format, then to a photographic negative. JPL selected various approaches that provided maximum improvement in interpretation and feature discrimination of the image subject.

The collection includes photographs, negatives, correspondence, presentation materials, handwritten notes and three open reel magnetic data tapes documenting the Optical Image Enhancement Feasibility Study.

Finding aid available in the repository.

Tracings

Jet Propulsion Laboratory – History
U.S. Air Force – Contracts
Image Enhancement
Gray Scale
Image Analysis
Blackwell, R. J.
Hussey, Kevin J.
Ault, William
Okimoto, Lance

Part of Accession 1989-11; Shipment # 7895.